

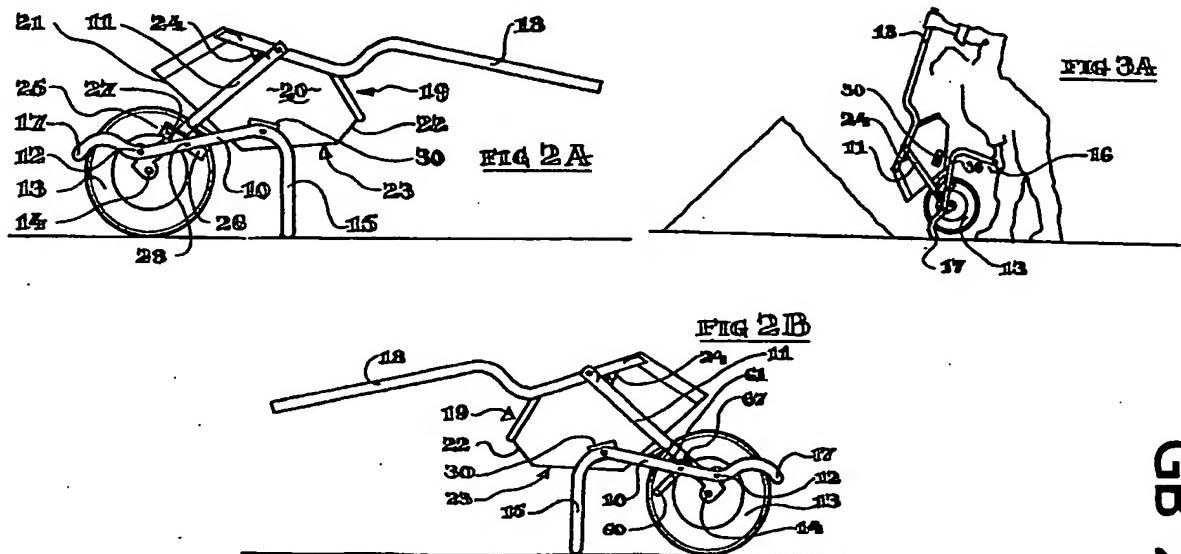
(12) UK Patent Application (19) GB (11) 2 289 024 (13) A

(43) Date of A Publication 08.11.1995

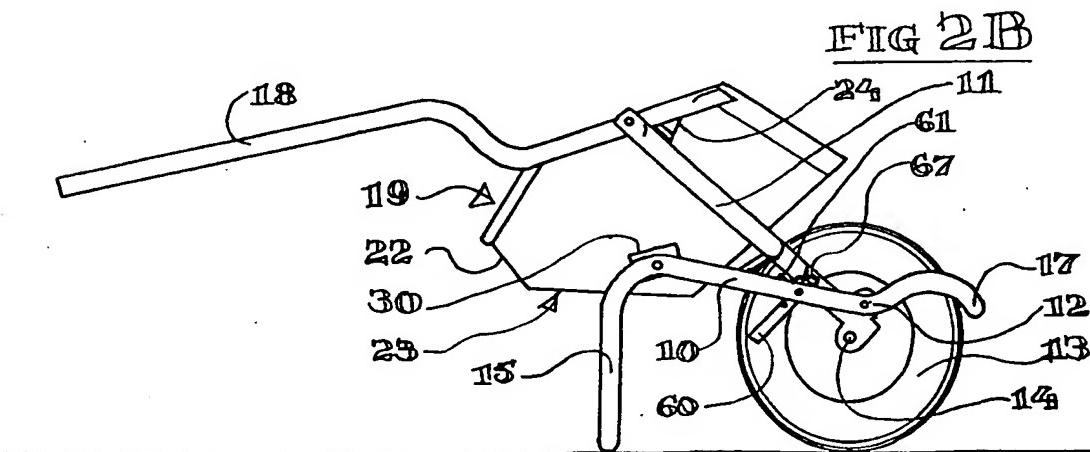
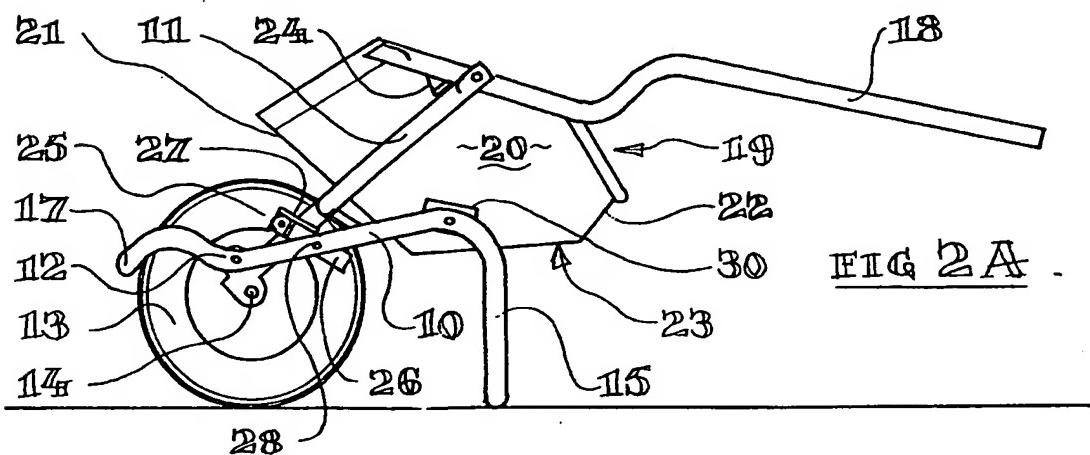
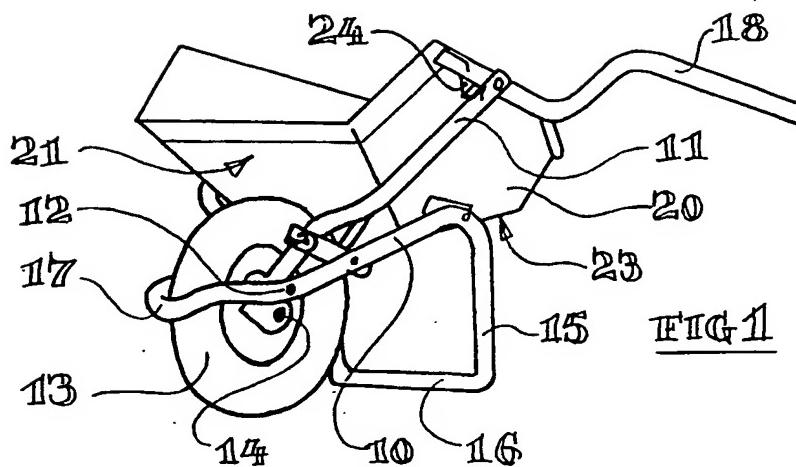
(21) Application No 9408802.8	(51) INT CL ⁶ B62B 1/20
(22) Date of Filing 04.05.1994	(52) UK CL (Edition N) B7B BTL2 BTW
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(72) Inventor(s) Peter George Mills	(58) Field of Search UK CL (Edition N) B7B BTL2 BTW INT CL ⁶ B62B 1/18 1/20 ONLINE- WIPI
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(54) Wheelbarrows

(57) A wheelbarrow has a sub-frame 10 and 11 pivoted to the load-carrying body 20 and moveable between a raised position clear of the ground when the wheelbarrow is in its normal wheeling, standing or tipping dispositions and a lowered position where a part of the sub-frame is in contact with the ground, and means 30 releasably to lock the sub-frame to the body 20 in its said raised position, such that the sub-frame may be held down by a user who may use handle arrangement 18 on the body to cause the said load-carrying body 20 to separate and perform a scooping action whilst pivoting about said sub-frame, to assist the loading or unloading. A damper may be provided between the sub frame parts 10, 11 and an alternative position for the locking means may be provided.



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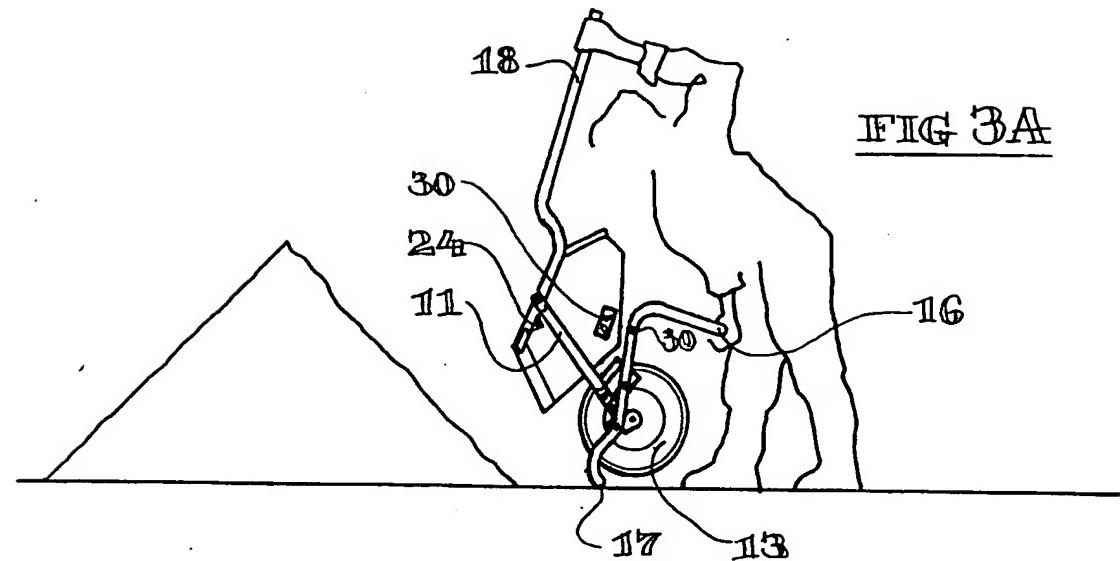


FIG 3A

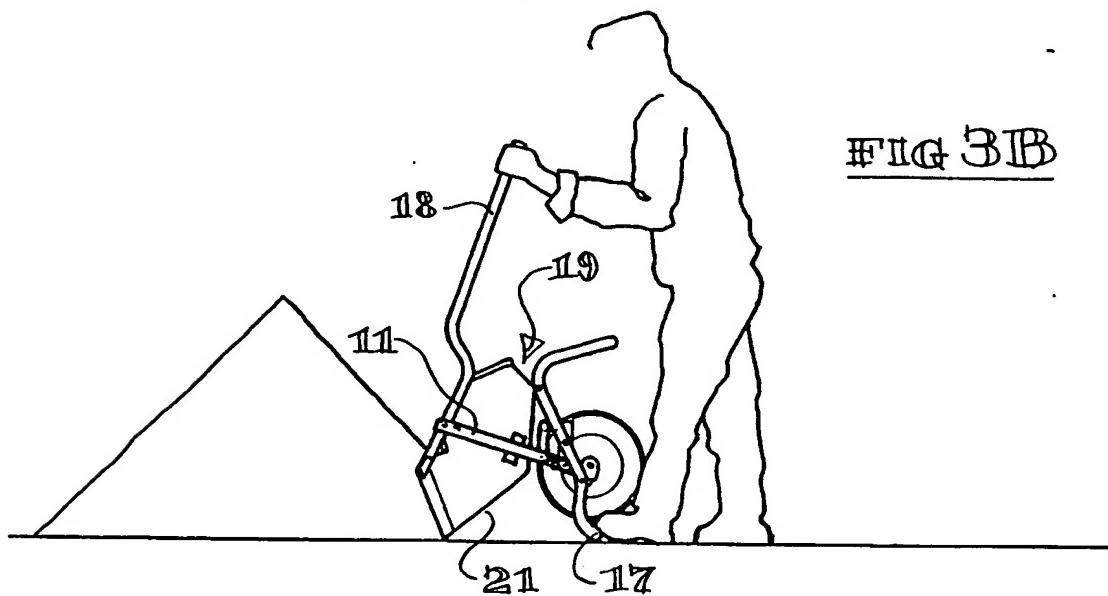


FIG 3B

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FIG 3C

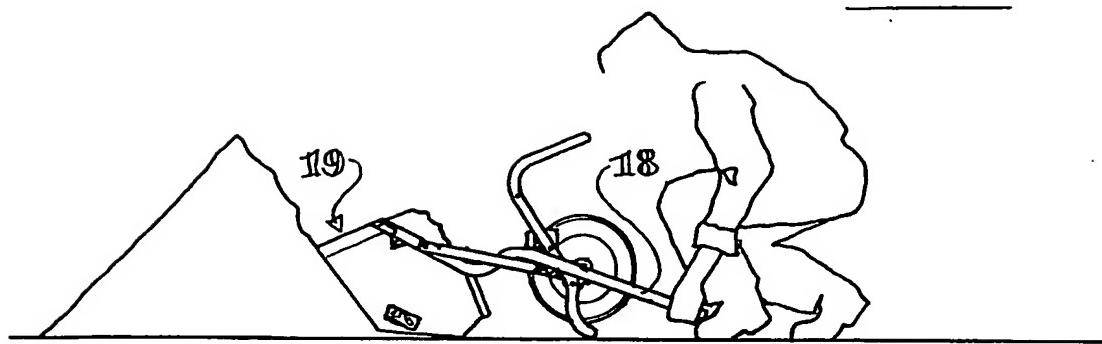
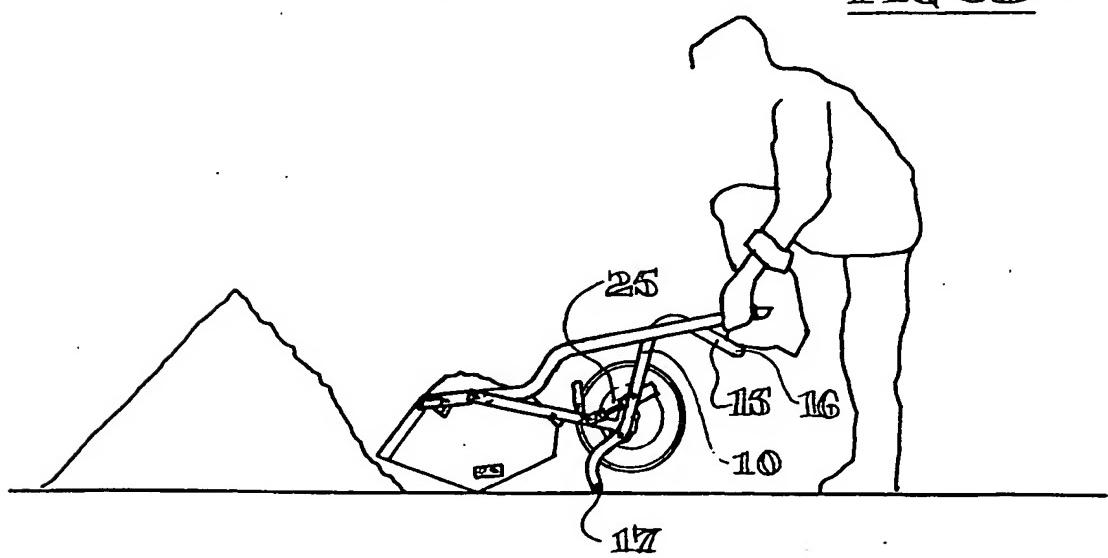


FIG 3D



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FIG 3E

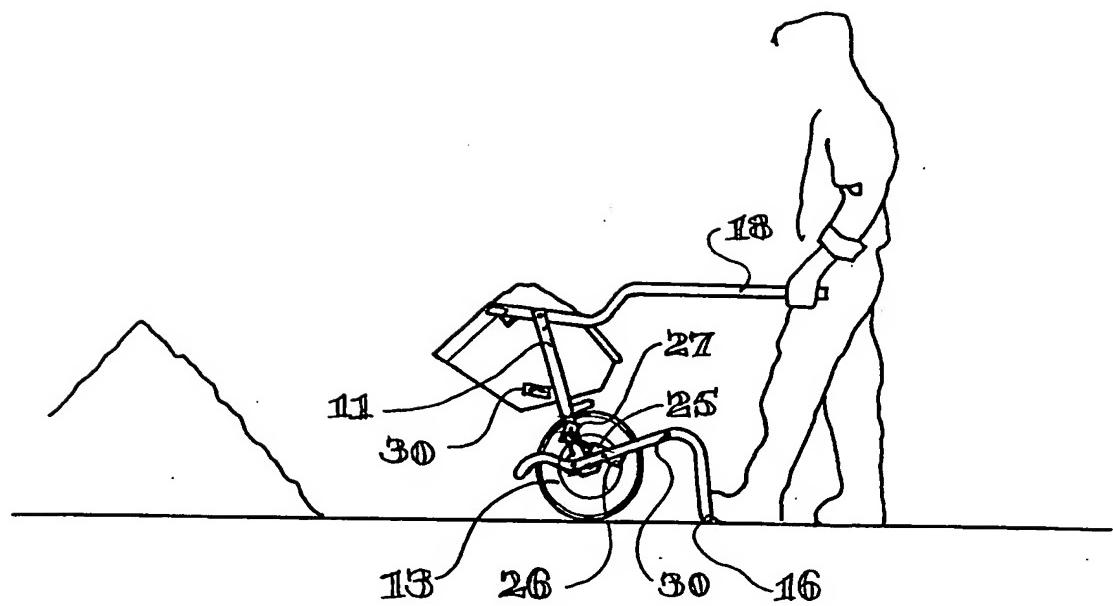
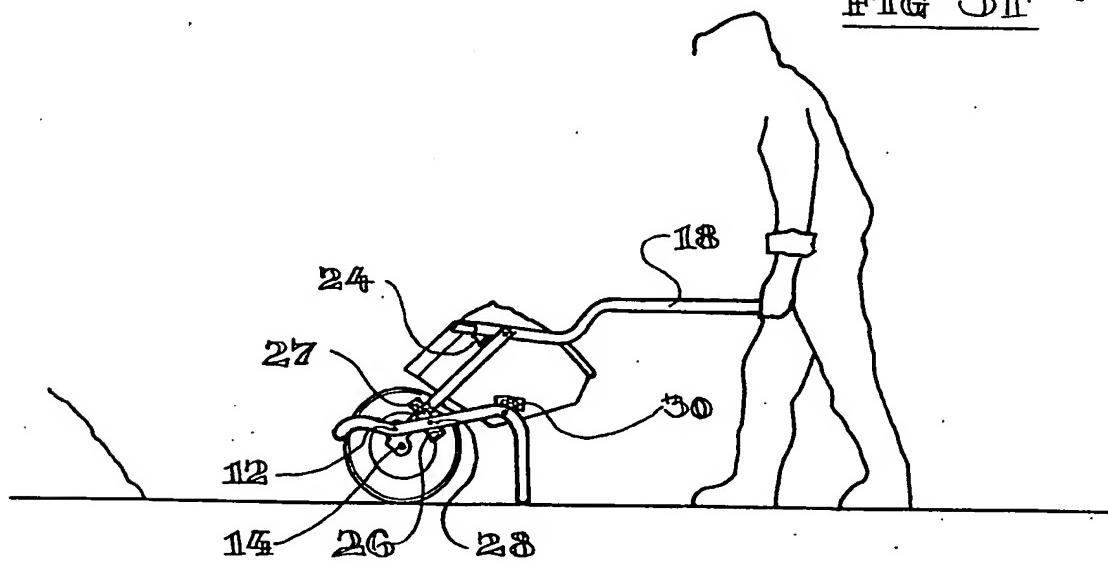
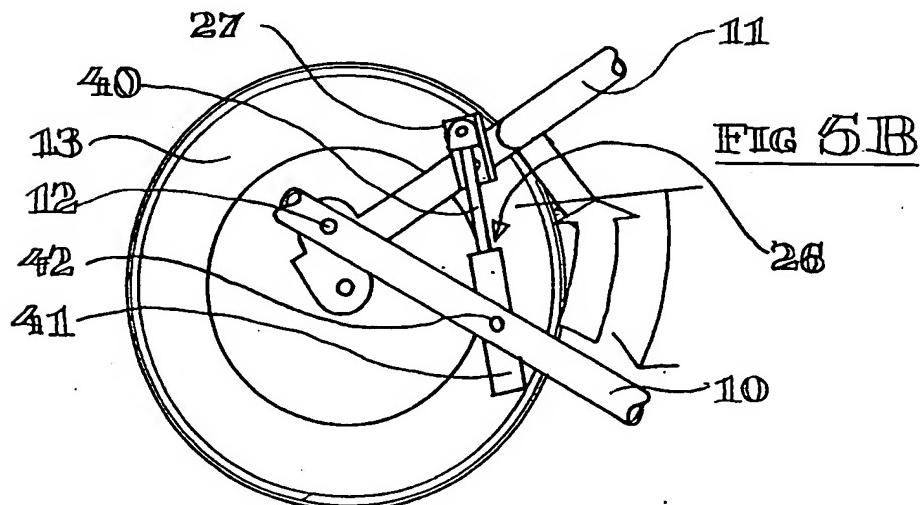
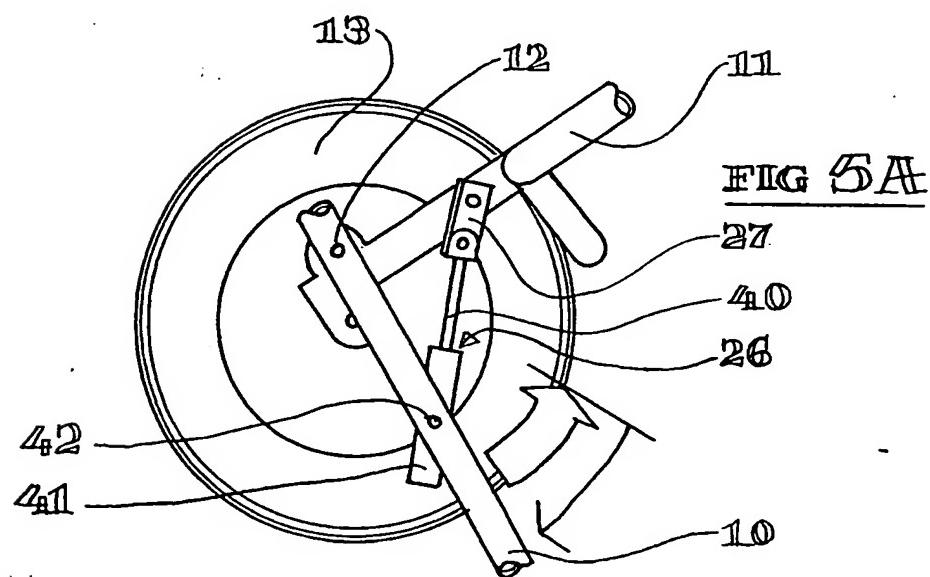
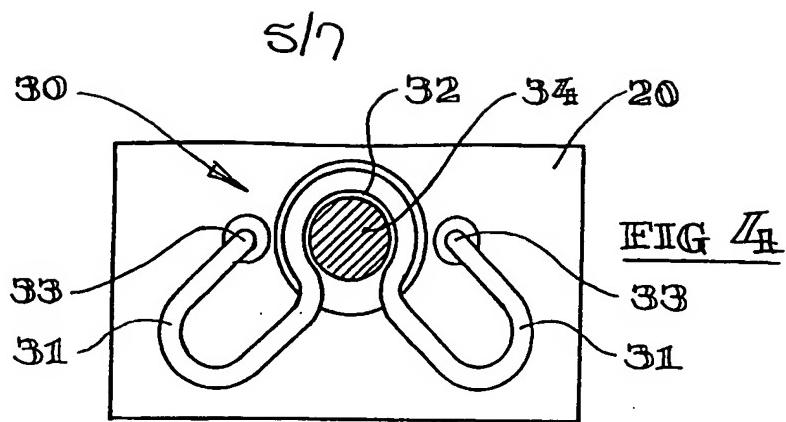


FIG 3F





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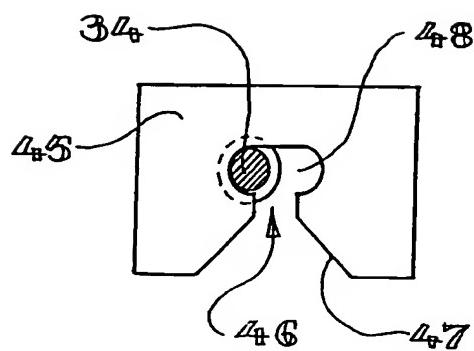


FIG 6

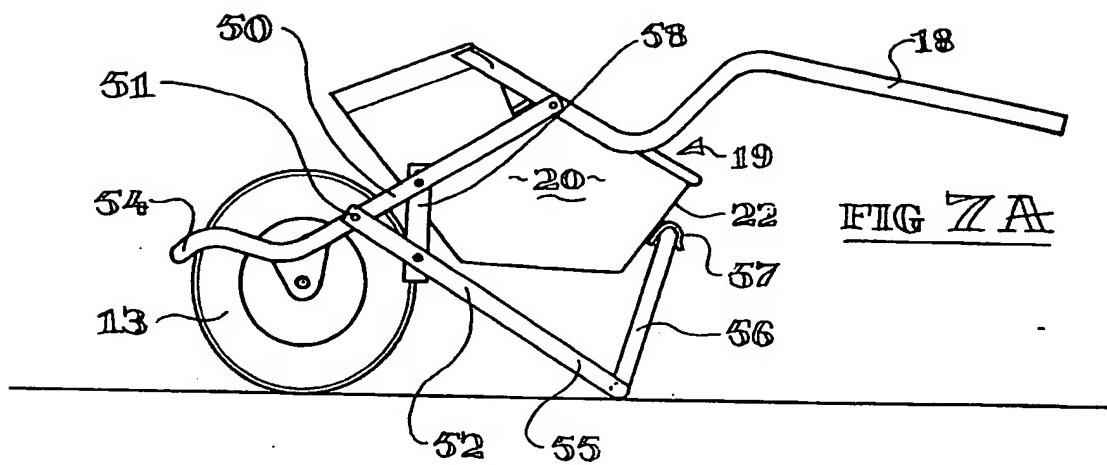


FIG 7A

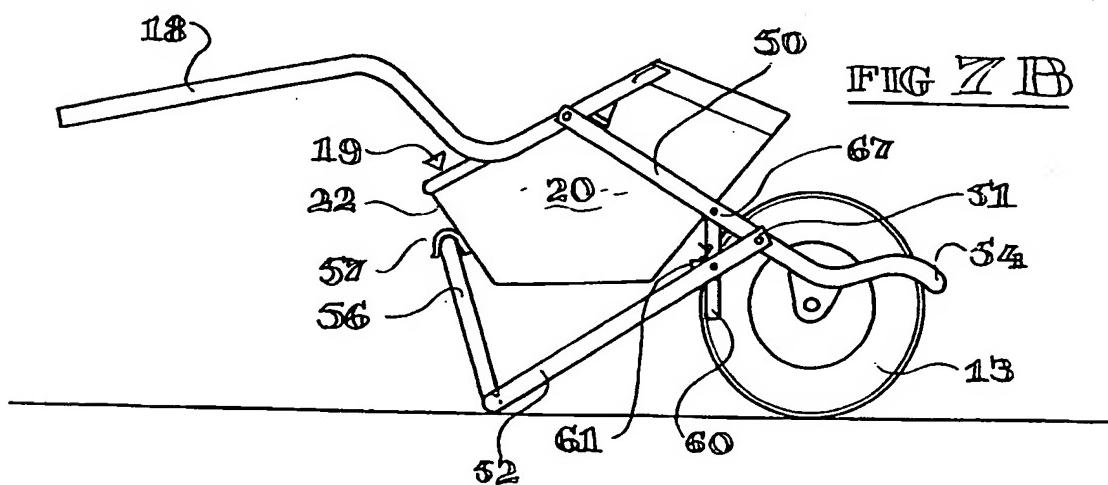
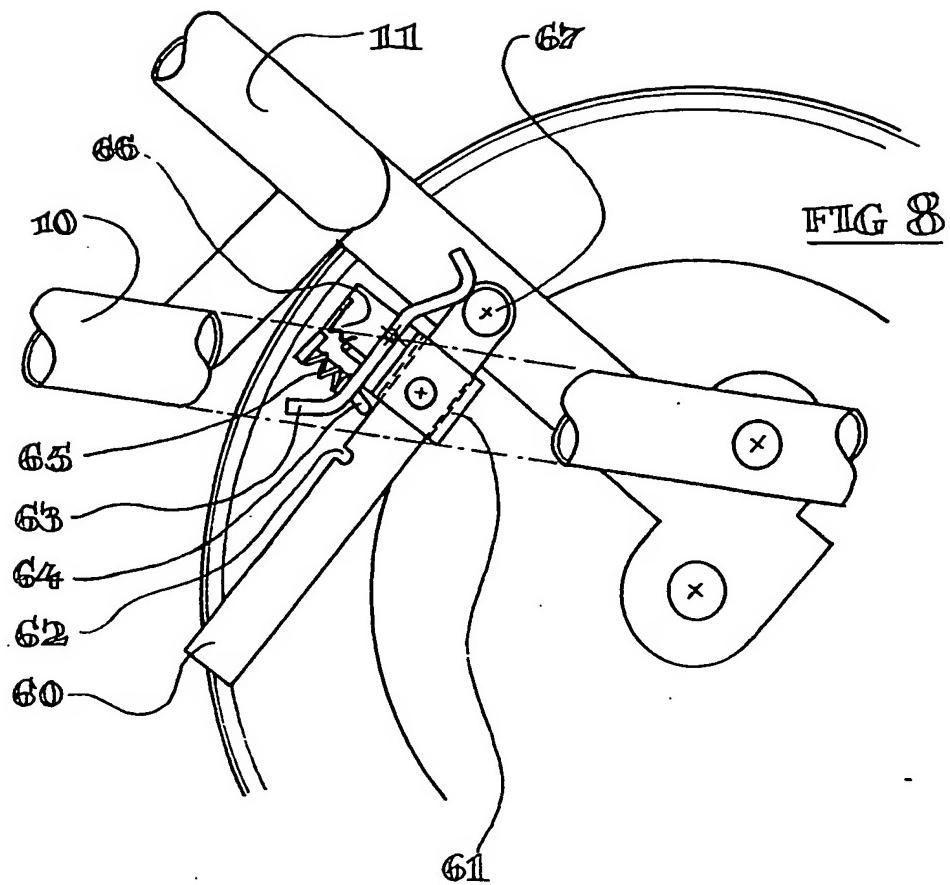


FIG 7B

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WHEELBARROWS

This invention relates to a wheelbarrow, and in particular to a wheelbarrow which is specifically designed and arranged to assist at least the loading thereof, but possibly also the unloading thereof.

5 A conventional wheelbarrow has a load-carrying body which supports a wheel and also has a pair of handles projecting rearwardly, the wheelbarrow being arranged as a second-order lever about the wheel axis. Usually, the handles and wheel support are formed as a 10 separate chassis to which the body is attached. Such a wheelbarrow has to be loaded manually, typically with a fork or shovel depending upon the nature of the load to be carried. When the wheelbarrow is to be unloaded, it may be pivoted forwardly initially about the wheel axis 15 but then about a frame member which usually extends around the front of the wheel and which engages the ground once the wheelbarrow has been turned through a sufficient angle, until the load may fall forwardly out of the body. Alternatively, if the wheelbarrow has a 20 single-wheel, a load may be emptied by tipping the wheelbarrow sideways until the load may fall out of the body.

There have been various proposals to assist the loading and unloading of wheelbarrows, such as the 25 provision of hinged or removable load-carrying body

walls. Also, in the case of a two-wheeled wheelbarrow, it is known directly to pivot a load-carrying body to a chassis which supports the wheels, so that the body may be pivoted with respect to the chassis to facilitate
5 unloading.

The present invention aims at providing a wheelbarrow somewhat similar in size and appearance to a conventional domestic wheelbarrow but which nevertheless is significantly easier to load and which
10 also may facilitate the unloading of a carried load.

According to one aspect of the present invention, there is provided a wheelbarrow comprising a load-carrying body supporting at least one ground wheel and having a handle arrangement projecting from the body
15 and by means of which the wheelbarrow may be wheeled from place to place when carrying a load, the wheelbarrow further including at least one sub-frame pivoted to the body and movable between a raised position clear of the ground when the wheelbarrow is in
20 its normal standing or wheeling dispositions and a lowered position where a part of the sub-frame is in contact with the ground rearwardly of the ground wheel, and means releasably to lock the sub-frame in its said raised position, the arrangement being such that the
25 sub-frame, when in its said lowered position, may be pressed into ground contact by a user who may simultaneously apply force to the handle arrangement

thereby to cause the load-carrying body to perform a scooping action whilst pivoting about said sub-frame, to assist the loading or unloading of the load-carrying body.

5 According to a preferred form of the present invention, there is provided a wheelbarrow comprising a frame including first and second frame parts hinged together, a load-carrying body pivoted to one of said frame parts and having a handle arrangement projecting
10 therefrom, and there being a releasable connection between the body and the other of said frame parts which connection is at a location spaced from the pivot between the body and said one frame part whereby when so connected the body and two frame parts are held in a
15 pre-determined relative disposition, the frame rotatably supporting a ground wheel and the arrangement being such that when the body and two frame parts are in said predetermined disposition, the body may be wheeled along the ground by a user holding the handle arrangement with the body being at least partially supported by the wheel.
20

It will be appreciated that with the preferred form of wheelbarrow of the present invention, there is a frame which consists of two separate but relatively
25 pivoted frame parts, the load-carrying body being supported by the frame and being pivotable from its "normal" position (that is, with the body and two frame

parts in said predetermined disposition) to a further position where the body is disposed closely adjacent the ground, so facilitating the loading of that body. Moreover, in a preferred aspect, the body may be 5 pivoted from that further position with a scooping action so enabling the direct loading of material to be carried from a heap thereof, during an initial stage of moving the body back to its normal position ready for wheeling of the wheelbarrow.

10 It would be possible to have the wheel rotatably supported by said other frame part, in which case said one frame part may comprise link means pivoted at one end to said other frame part and at the other end to the body. In such an arrangement, said other frame 15 part may provide leg means which imparts stability to the wheelbarrow when left to stand in its normal position. Preferably, however, the wheel is rotatably supported by said one frame part and said other frame part provides leg means to impart stability to the 20 wheelbarrow when left to stand in its normal position. In this case, said other frame part advantageously is releasably connected to the body at or adjacent the rear thereof. The other frame part may be pivoted to said one frame part at a location part-way between the 25 wheel axis and the pivotal connection of said one frame part to the body, or could be pivoted at a location forwardly of the wheel axis.

In this preferred arrangement said one frame part may take the form of a link effectively extending between the wheel and the pivotal connection to the body. Then, for a case where the link means is pivoted 5 to the body about an axis rearwardly of the wheel axis, movement of the body from its normal position to a loading position takes the link means over centre.

In either embodiment of this invention, the first and second frame parts each may include a pair of 10 similar, parallel rigid members disposed one to each side respectively of the load-carrying body, which parallel members may appropriately be connected together by cross-members. These frame parts may be configured such that the respective pairs of members 15 thereof may pass over one another during relative pivoting movement of the frame parts.

Abutment means may be provided to prevent relative pivoting movement between the body and said one frame part in one direction, beyond a pre-set limit upon an 20 upward force being applied to the handle arrangement. This abutment means thus constrains the one frame part to pivot with the body as the handle arrangement is lifted upwardly and pushed forwardly to move the body from its normal position to the start of a loading 25 position. From this position, the body may be used as a scoop; upon the front edge of the body contacting the ground, then the handle arrangement may be pulled back

to permit the body to be pivoted in the opposite sense about the pivotal connection with the one frame part prior to the body being moved back to its normal position.

5 The releasable connection between the other frame part and the body advantageously is arranged to operate automatically at least in one sense (that is, either engaging or disengaging) upon being subjected to a force greater than some pre-set value. Preferably,
10 such automatic operation occurs both for engagement and disengagement, but alternatively the connection could be provided with a manually operable locking arrangement so requiring a positive action by a user either for engaging or disengaging operation, or even
15 both.

A damping arrangement may be provided to act between the first and second frame parts, so as to restrict the freedom of relative movement between the first and second frame parts. Such a damping
20 arrangement may comprise a linear damper, and conveniently a gas or air dash-pot.

A self-engaging releasable catch may be arranged between the two frame parts, whereby relative pivoting movement therebetween is resisted once the catch has
25 engaged, until the catch is manually released. Such a catch advantageously holds the two frame parts between the extreme limits of their relative movement. The use

of a catch as aforesaid may assist the loading of the wheelbarrow with a scooping action, in a heap of material to be loaded.

The handle arrangement may be essentially conventional and thus comprise a pair of handles attached to the body and projecting rearwardly therefrom. Alternatively, a U-shaped handle may have the two limbs thereof attached to the two sides of the body, respectively.

By way of example only, two specific embodiments of wheelbarrow constructed and arranged in accordance with the present invention will now be described in detail, reference being made to the accompanying drawings, in which:-

Figure 1 is a general perspective view of a first embodiment of wheelbarrow of this invention;

Figures 2A and 2B are left and right side-views of the wheelbarrow of Figure 1;

Figures 3A to 3F is a series of side-views showing the loading of the wheelbarrow of Figures 1 and 2;

Figure 4 is a detailed view of an automatic releasable connection between the body and a frame part of the wheelbarrow of Figure 1;

Figures 5A and 5B are detailed views of damper arrangement employed in the wheelbarrow of Figures 1 and 2;

Figure 6 shows an alternative automatic releasable connection;

Figures 7A and 7B are left and right side-views of a second embodiment of wheelbarrow of this invention;
5 and

Figure 8 shows a releasable catch arranged between the two frame parts.

Referring initially to Figures 1 and 2, it can be seen that the first embodiment of wheelbarrow of this 10 invention comprises a frame or chassis constructed from first and second frame parts 10 and 11, pivoted together about an axis 12. The lower end of the second frame part 11 rotatably supports a ground wheel 13 about an axis 14 adjacent axis 12. The first frame part 15 is formed to define a pair of legs 15 linked together at their lower ends by a cross member 16, and forwardly of the wheel 13, the first frame part is formed as a U-shaped extension 17 passing around the wheel 13. The second frame part 11 comprises a pair of parallel 20 links, the lower end of each link being pivoted to the first frame part about said axis 12 and the upper end being pivoted to a respective handle 18 of a rearwardly-projecting pair thereof. The two handles 25 are attached to a load-carrying body 19, along the upper edges of a pair of side walls 20 thereof. In addition to the side walls, the body further includes a front wall 21, a rear wall 22 and a base 23.

Each side wall 20 is furnished with a respective abutment 24 which engages the upper side of the respective second frame part 11, when the wheelbarrow is in its normal position illustrated in Figures 1 and 5. These abutments prevent the body rotating from the position illustrated in Figures 1 and 2, about the pivotal connection between the handles (and body) and the second frame part when an upward force is applied to the handles 18.

10 Movement between the first and second frame parts about axis 12 is restricted by a damper arrangement 25, described in more detail below with reference to Figures 5A and 5B. The damper arrangement comprises an air dash-pot 26 the cylinder of which is pivoted to the 15 first frame part about an axis 28, and the piston rod of the dash-pot is pivoted to a link 27 which link is itself pivotally connected to the second frame part. Relative movement between the first and second frame parts thus expands and contracts the dash-pot, the link 20 27 pivoting as required about axis 28.

A pair of releasable connections 30 are provided between the body 19 and the first frame part 10, one on each side of the body, and one of which connections is shown in more detail in Figure 4. A spring steel rod 25 31 is shaped to define a re-entrant recess 32 and has its ends 33 secured to the side wall 20 of the body 19. A stud 34 is secured to the first frame part at an

appropriate position for interconnecting with the recess 32, as the body is pivoted back to the position illustrated in Figures 1 and 2. A sufficient force applied upwardly to the body will allow the rod 31 to 5 spring free of the stud 34; conversely, a sufficient force applied downwardly to the body will re-engage the stud 34 into the recess 32 defined by rod 31.

Referring now to Figures 3A to 3F, there is shown the sequence of steps which is followed in order to 10 allow the above-described wheelbarrow to be used as a scoop, to facilitate the loading of the wheelbarrow with particulate material in a heap, such as a pile of sand. The wheelbarrow is initially in its normal position as illustrated in Figures 1 and 2; in front of 15 the heap, the handles 18 are lifted to pivot the entire wheelbarrow until the U-shaped extension 17 engages the ground and the wheel 13 comes clear of the ground (Figure 3A). Then, whilst still pushing the handles 18, a downward force is applied to cross member 16 to 20 separate the connections 30, so allowing the second frame part 11 to swing counter-clockwise (in Figure 3A) with respect to the first frame part, until the front edge of the body bites into the heap and contacts the ground (Figure 3B). During this last stage of the 25 above action, the two frame parts lock together in their relative disposition illustrated in Figure 3B by means of a self-engaging releasable catch, illustrated

in Figure 8. A stay 60 is pivoted to frame part 10 and slides within a slot formed through a block 61 pivoted to frame part 11. The stay is formed with a notch 62; a lever 63 is pivoted to the block 61 and has a spigot 5 64 which is engageable with notch 62 when the two frame parts are in an appropriate relative disposition. A spring 65 acts between the block 61 and lever 63 to cause the spigot automatically to move into the notch 62 when aligned therewith. A spring clip 66 may hold 10 the lever 63 with the spigot clear of the notch 62 notwithstanding an appropriate alignment, should the operator so desire. However, the lever will automatically be moved free of the clip 66 by interference between the lever and a boss 67 centred on 15 the lever pivot to frame part 11, as the spigot approaches that position where it may engage the notch 62.

The self-engaging releasable catch engages automatically as the frame parts reach the position 20 illustrated in Figure 3B. The operator then applies foot-pressure to the frame to hold extension 17 in contact with the ground and a clockwise force is then applied to the handles 18 so rotating the body 19 through the heap and thus picking up a quantity of the 25 particulate material (Figure 3C). The operator may repeat this action until a sufficient quantity of material has been loaded. Then, he releases the catch

(Figure 8) by pressing on lever 63, and positions the frames as shown in Figure 3D. Next, the operator, conveniently using his foot, presses downwardly on the cross member 16 of the first frame part (Figure 3D), so 5 raising the body in view of the limited freedom of movement between the first and second frame parts provided by the damper arrangement 25. When the cross member 16 contacts the ground (Figure 3E), continued pulling and downward force upon the handles 18 rotates 10 the second frame part until the connections 30 are re-engaged, so restoring the wheelbarrow to its normal position.

If now the handles be lifted, the releasable connections 30 will remain engaged and so the 15 wheelbarrow will behave in an essentially conventional manner. It may thus be wheeled to a discharge site, whereat the carried load may be emptied by tipping the entire wheelbarrow in the manner illustrated in Figure 3A. Alternatively, the releasable connections could be 20 broken whilst maintaining the cross member 16 in contact with the ground and the body then emptied by pivoting the second frame part with respect to the first frame part.

Referring now to Figures 5A and 5B, there is shown 25 in more detail the damper arrangement mentioned above. In addition to the dash-pot 26 itself, there is provided a link 27 which is rotatable about its

connection to the second frame part 11 and which interconnects the piston rod 40 of the dash-pot to that frame part. The cylinder 41 of the dash-pot is pivoted at 42 to the first frame part 10.

5 Starting from a position where the included angle between the two frame parts is at its smallest possible value (that is, the dash-pot is fully contracted) the two frame parts may freely pivot in a relatively separating manner, increasing the included angle up to
10 the position illustrated in Figure 5A. From there, there is free travel to reduce the included angle as the link 27 rotates about its pivotal connection to the second frame part, as illustrated by the broad arrow in Figure 5A. Once the link 27 has rotated, the dash-pot
15 starts to operate to restrict free closing movement of the two frame parts until the dash-pot is fully contracted, as illustrated by the broad arrow in Figure
5B.

Figure 6 shows an alternative releasable
20 connection, to replace that illustrated in Figure 4. Here, a plate 45 is attached to the side wall 20 of the body, the plate defining a slot 46 having a tapering mouth 47 leading into an enlarged region 48. As in the arrangement of Figure 4, the first frame part carries a
25 stud 34 which may engage in the region 48, by virtue of the general springiness of the overall construction of the two frame parts and the body. If required, a

separate manually-operable lock (not shown) may be provided to maintain the stud 34 in the region 48 of the plate.

Referring now to Figure 7, there is shown a second embodiment of wheelbarrow of the invention, and like parts are given like reference characters. Here, the second frame part 50 is extended beyond its pivotal connection about axis 51 to the first frame part 52 and rotatably supports a ground wheel 13. The second frame part has a U-shaped extension 54, comparable to the extension 17 of the first embodiment. The first frame part 52 has first and second portions 55 and 56 which together define legs for the wheelbarrow, there being a cross member extending between the upper ends of the second portion 56. The cross member (not visible in Figure 2) is releasably engageable in a connector 57 provided on the rear wall 22 of the load-carrying body 19. A damper arrangement 58 is provided between the first and second frame parts 52 and 50, which damper arrangement is similar to that illustrated in Figures 5A and 5B. Though not shown in Figure 7, a further cross member may be provided between the two sides of the first frame part 52, in the region of the junctions between first and second portions 55 and 56 thereof, for the same purpose as cross member 16 of the first embodiment.

In use, this second embodiment of wheelbarrow

performs in essentially the same manner as that described above with reference to Figures 3A to 3F. It will not therefore be described in further detail here.

CLAIMS

1. A wheelbarrow comprising a load-carrying body supporting at least one ground wheel and having a handle arrangement projecting from the body and by means of which the wheelbarrow may be wheeled from place to place when carrying a load, the wheelbarrow further including at least one sub-frame pivoted to the body and movable between a raised position clear of the ground when the wheelbarrow is in its normal standing or wheeling dispositions and a lowered position where a part of the sub-frame is in contact with the ground rearwardly of the ground wheel, and means releasably to lock the sub-frame in its said raised position, the arrangement being such that the sub-frame, when in its said lowered position, may be pressed into ground contact by a user who may simultaneously apply force to the handle arrangement thereby to cause the load-carrying body to perform a scooping action whilst pivoting about said sub-frame, to assist the loading or unloading of the load-carrying body.
2. A wheelbarrow comprising a frame including first and second frame parts hinged together, a load-carrying body pivoted to one of said frame parts and having a handle arrangement projecting therefrom, and there being a releasable connection between the body and the other of said frame parts which connection is at a

- location spaced from the pivot between the body and said one frame part whereby when so connected the body and two frame parts are held in a pre-determined relative disposition, the frame rotatably supporting a
5 ground wheel and the arrangement being such that when the body and two frame parts are in said predetermined disposition, the body may be wheeled along the ground by a user holding the handle arrangement with the body being at least partially supported by the wheel.
- 10 3. A wheelbarrow as claimed in claim 2, wherein the wheel is rotatably supported by said other frame part and said one frame part comprises link means pivoted at one end to said other frame part and at the other end to the body.
- 15 4. A wheelbarrow as claimed in claim 3, wherein said other frame part provides leg means to impart stability to the wheelbarrow when left to stand in said pre-determined disposition.
5. A wheelbarrow as claimed in claim 2, wherein the
20 wheel is rotatably supported by said one frame part and said other frame part provides leg means to impart stability to the wheelbarrow when left to stand in said pre-determined disposition.
6. A wheelbarrow as claimed in claim 5, wherein
25 said one frame part comprises link means pivoted at or adjacent one end to said other frame part about an axis coincident with or adjacent the wheel axis.

7. A wheelbarrow as claimed in claim 6, wherein said other end of the link means is pivoted to the body about an axis rearwardly of the wheel axis with respect to the normal pushed direction of movement of the
5 wheelbarrow when the body is in said pre-determined disposition.
8. A wheelbarrow as claimed in claim 5, wherein the other frame part is pivoted to said one frame part at a location part way between the wheel axis and the
10 pivotal connection of said one frame part to the body.
9. A wheelbarrow as claimed in any of claims 2 to 8, wherein the first and second frame parts each includes a pair of similar, parallel rigid members disposed one to each side respectively of the load
15 carrying body.
10. A wheelbarrow as claimed in claim 9, wherein the first and second frame parts are configured such that the respective pairs of members thereof may pass over one another during relative pivoting movement.
- 20 11. A wheelbarrow as claimed in any of claims 2 to 10, wherein there is provided abutment means to prevent relative pivoting movement between the body and said one frame part beyond a pre-set limit upon an upward force being applied to the handle arrangement.
- 25 12. A wheelbarrow as claimed in any of claims 2 to 11, wherein a damper is provided between the first and second frame parts to restrict the freedom of relative

movement therebetween.

13. A wheelbarrow as claimed in any of claims 2 to 12, wherein the releasable connection between said other frame part and the body is arranged to operate automatically whenever a force greater than some preset minimum is applied to the connection.

14. A wheelbarrow as claimed in any of claims 2 to 13, wherein a self-engaging releasable catch is arranged between the two frame parts, whereby relative pivoting movement therebetween is resisted once the catch has engaged, until the catch is manually released.

15. A wheelbarrow as claimed in any of claims 2 to 14, wherein the frame supports a single ground wheel disposed between the members of the frame parts.

16. A wheelbarrow as claimed in any of claims 2 to 14, wherein the frame supports a pair of co-axial ground wheels disposed one to each side of and outside the members of the frame parts.

20 17. A wheelbarrow as claimed in any of the preceding claims, wherein the handle arrangement comprises a pair of similar handles arranged one to each side of the load carrying body and projecting rearwardly therefrom.

18. A wheelbarrow substantially as hereinbefore 25 described, with reference to and as illustrated in Figures 1 to 5 and 8, or in Figures 6 and 7 of the accompanying drawings.



The
Patent
Office

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Application No: GB 9408802.8
Claims searched: 1-18

Examiner: David Whitfield
Date of search: 17 July 1995

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): B7B (BTW) (BTL2)

Int Cl (Ed.6): B62B 1/18 B62B 1/20

Other: ONLINE:- WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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